Tympanotomy

Exploratory "Laparotomy" of the Middle Ear

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• **In some cases of conduction deafness or mixed deafness, direct inspection of the area believed to be involved is the only means by which diagnosis can be made with certainty. This can be done by a method of tympanotomy that is used for stapes mobilization. The necessary exposure is done with local anesthesia, is not painful, is well tolerated by the patient and requires only two days in hospital.**

Reparative procedures may be carried out as indicated.

DESPITE GREAT PROGRESS in the knowledge of the physiologic principles and of pathologic changes in hearing and despite considerable advances in methods of testing and analyzing hearing losses, there are still patients with conduction deafness or mixed deafness in whom the exact nature of the damaging process can only be surmised. Occasionally these patients present a middle ear problem that can be resolved only by direct inspection.

With the demonstration by Rosen[1,2,3] of the technique of tympanotomy for stapes mobilization, a relatively simple surgical means has become available for exploration of the middle ear in these diagnostic problem cases. The term "simple" in connection with tympanotomy refers only to the ease with which the procedure is tolerated by the patient. For the surgeon, mastery of tympanotomy requires considerable time in the anatomy laboratory and much practice in the use of the operating microscope. The procedure is done under local anesthesia. Since the nerve supply of practically the entire area to be explored can be reached by injection of the superior, posterior and inferior portions of the external auditory canal, I have abandoned the anterior injection included by Rosen in his original technique.

In order to illustrate what may be accomplished by exploratory tympanotomy two cases have been selected from a series of 200 in which I have operated by the tympanotomy approach for stapes mobilization, myringoplasty, tympanoplasty, etc.

The first patient, a man 33 years of age, was examined at the request of another otolaryngologist because of unilateral conduction deafness (Figure 1). The patient had a history of ear difficulty in childhood and was not certain about a possible hearing loss before World War II. He knew definitely, however, that when his ship exploded while he was on Navy duty during the war he had severe deafness in the right ear. There was no history of discharge from the ear and the drum membrane on examination was perfectly normal. The result of

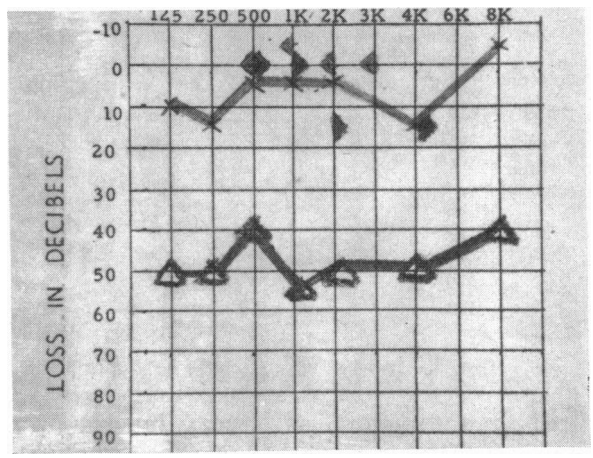

Figure 1.—Preoperative audiogram (Case 1). Left ear conduction deafness with decided bone-air gap.

Rinne's test was negative in the right ear and the Weber test lateralized to the right. While the 64-cycle tuning fork was not heard in the right ear, the Lewis test was negative for stapes fixation. In view of the audiometric and clinical findings and the presence of partial recruitment it was felt the patient had unilateral otosclerosis with some cochlear damage. The patient requested surgical treatment because as an attorney he had considerable difficulty in court when opposing counselors were seated on his deaf side. A right tympanotomy was done on August 3, 1957. At operation, the capitulum of the stapes was found to be smooth and rounded and the long process of the incus was bound to the inner surface of the drum membrane by fibrous adhesions (Figure 2) and was completely separated from the stapes. The incus was carefully

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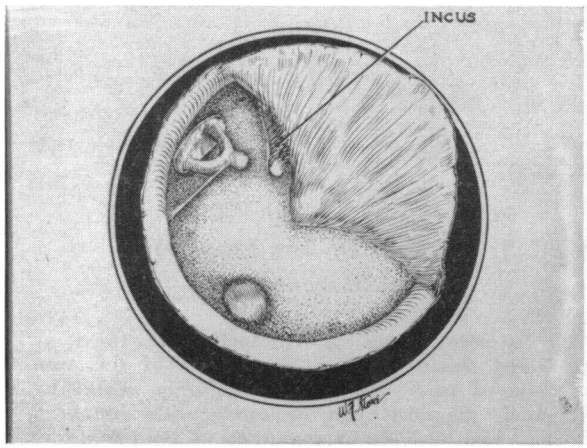

Figure 2.—Appearance of middle ear at tympanotomy (Case 1).

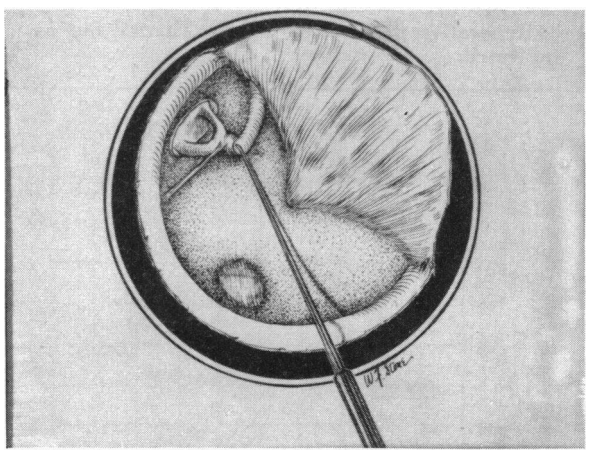

Figure 3.—Incus re-approximated to stapes.

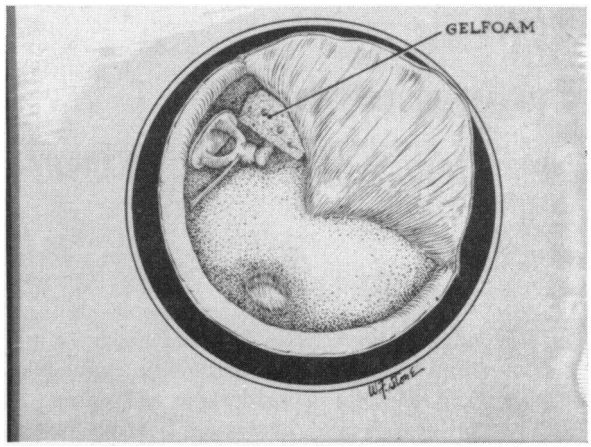

Figure 4.—Gelfoam to maintain approximation of incus and stapes.

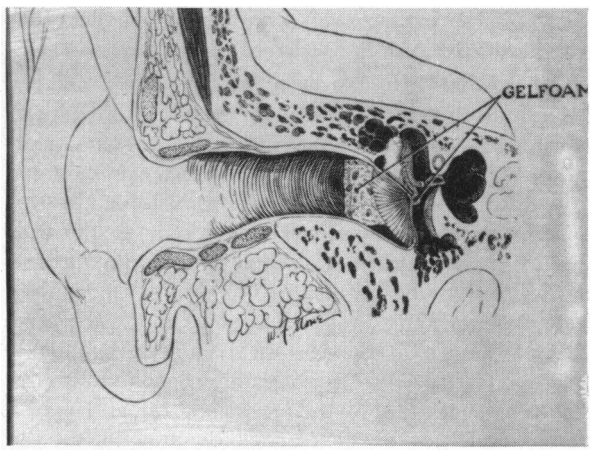

Figure 5.—Drum membrane replaced and gelfoam in canal to maintain drum position.

freed from the drum and readily brought back into articulation with the stapes (Figure 3). Palpation of the stapes disclosed it to be completely mobile and the patient noted immediate hearing improvement on contact of the capitulum of the stapes with the palpating instrument. The articular surface of the stapes was lightly scarified with a fine needle before the incus was placed in contact with it. Then a small piece of gelfoam was placed between the incus and the drum membrane (Figure 4) and the drum membrane was replaced.

Another piece of gelfoam was placed on the outside of the drum membrane to secure it in place (see Figure 5). Recovery was uneventful. Two months after operation the hearing in the right ear was excellent (Figure 6), although there was a high tone loss, probably owing to acoustic trauma from the original blast injury, which undoubtedly was the cause of the incudo-stapedial separation. The hearing when tested a year and a half after operation was excellent. The patient had had no difficulty with the ear and was most pleased with his hearing for speech.

The second patient, 50 years of age, the mother of a physician, was first examined by the author in July, 1957. She had had a right mastoidectomy in childhood. Some five years before the time of the present report, loss of hearing developed in the left ear. The patient had consulted several otologists, both while her son was in medical school and after his establishment in practice. A diagnosis of glomus jugulare of the middle ear had been suggested. On examination a post-auricular mastoidectomy scar was noted on the right. The drum membrane in the right ear was intact. The left drum seemed rather dull, with some posterior fullness. There was, however, no pulsation and no redness such as one might expect from a glomus tumor. There was a suggestion of fluid anteriorly and superiorly in the middle ear, which certainly seemed unusual. Eustachian inflations in the past had reportedly helped the hearing. The Rinne test reaction was negative in the left ear

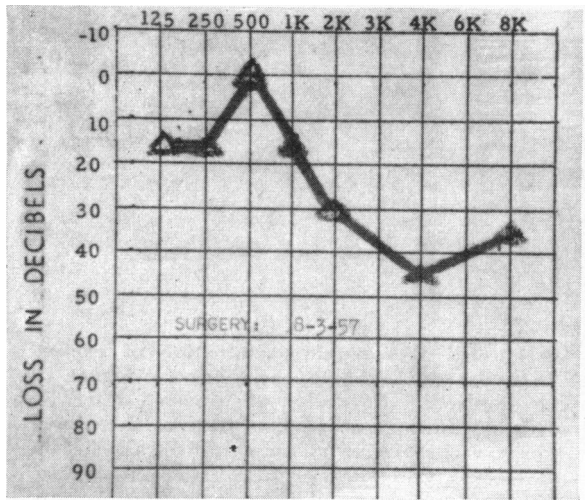

Figure 6.—Post-operative audiogram, left ear (Case 1).

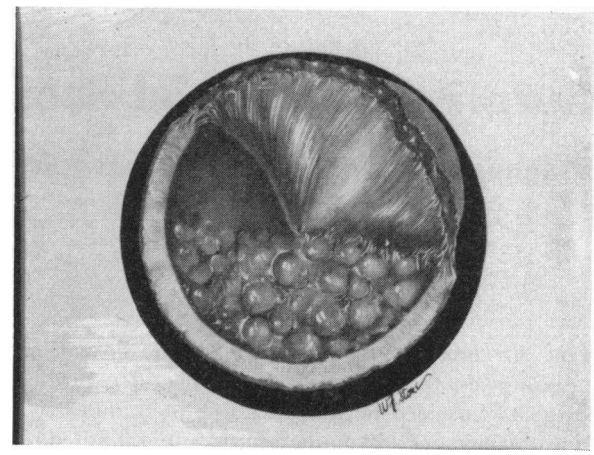

Figure 7.—Appearance of meningioma at tympanotomy (Case 2).

and equal in the right. Lateralization was questionable. The patient proved to be very difficult to test audiometrically. The tests were done both in my office and at the University of California Audiology Department. The conduction hearing loss in the right ear was believed to be associated with the previous mastoid operation. There certainly was an adequate air-bone gap in the left ear. I learned that the patient had had an aspiration myringotomy of the left ear, done by a very skillful otologist, in 1956 and had had much pain. Normally in serous otitis this procedure is painless. I, too, attempted aspiration of possible fluid in the left ear and the needle entered something of a slightly softer consistency than raw potato. The insertion was painful and no fluid was obtained. On August 31, 1957, left tympanotomy was done under local anesthesia. A papillomatous-appearing tumor was found in the middle ear (Figure 7). Excision of a biopsy specimen was very painful, but the recovery from tympanotomy was uneventful. On September 30, 1957, under general anesthesia the tympanotomy was repeated at the University of California Hospital and a tumor about 1.5 cm. in diameter, with narrow stalk, was dissected free from the middle ear. The exact point of attachment could not be determined. The pathologist's diagnosis was: "Meningioma, meningiotheliomatous type, left middle ear." The stapes was found intact at operation, but no incus could be seen. Recovery from this procedure was again uneventful but there was no hearing improvement at last examination some 16 months after operation.

This patient had had a carcinoma of the breast removed several years before the onset of deafness in the left ear.

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